

Bloomberg Currency Index Methodology

Version Tracker

Date	Update	Updated By
11/23/2021	Updated Index Memberships and Weightings to include the new rebalance date and the capping limit for the Chinese renminbi for the Bloomberg Dollar Index	Jas Singh, Ken Hoefling
4/21/2020	Updated to include ESG disclosure	Mia Motiee- Compliance
10/29/2018	Updated language for EU BMR	Ken Hoefling
4/27/2018	Index Policies and Procedures Updated	Ken Hoefling

TRACKING GLOBAL CURRENCY MOVEMENTS

The Bloomberg Currency Indices offer the Bloomberg Dollar Spot Index, the Bloomberg British Pound Index and the Bloomberg Euro Index. Each of these tracks the performance of the underlying currency versus a basket of leading global currencies.

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The indices, administered by Bloomberg Index Services Limited ("BISL" or the "Administrator" and, collectively with its affiliates, "Bloomberg"), reflect performance against both developed and emerging market currencies that have the highest liquidity in the currency markets and the biggest trade flows with the given country. The Bloomberg Currency Index family, which has dynamically updated compositions and diversified representations of a breadth of currencies that are important from trade and liquidity perspectives, provides a better measure of the underlying currencies than other currency indices that do not update their compositions or are comprised of only a handful of currencies with concentrated weights.

INDEX MEMBERSHIP AND WEIGHTINGS

At each annual rebalance, the following steps are taken to arrive at the constituent currencies and their weights:

1. Identify the top 20 currencies in terms of trading activity versus the underlying currency.
 - For U.S. dollar, this is as defined by the Federal Reserve in its Broad Index of the Foreign Exchange Value of the Dollar (Release H.10).
 - For the British Pound and Euro, this is as defined by the International Monetary Fund (IMF) in its yearly total trade (ECTR <Go> on the Bloomberg Professional service).
2. Identify the top 20 currencies from the Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity (Table: Currency Distribution of Global Foreign Exchange Market Turnover).
3. The preliminary index weights are driven by assigning averaging trade weights and liquidity weights to the combined set of currencies.
4. The final index weights are derived by:
 - a. Capping the exposure of Chinese renminbi at 7%¹ for the Bloomberg Dollar Index and 3% for the Euro and the Pound indices, and distributing its weight to other currencies in proportion to the average weight determined in step 3.
 - b. Removing smaller currency positions, defined as any position that has a weight of less than 2%, and distributing its weight to other currencies in proportion to the average weight determined in step 4.

Build the union of sets of top 10 currencies of both liquidity and trading activity lists, after removing currencies pegged to the underlying currency. For example, currencies pegged to the U.S. Dollar (such as Hong Kong dollar or Saudi riyal) are removed for the Bloomberg Dollar Spot Index. More information is available on PEG <go> on the Bloomberg Professional Service.

¹ Please note prior to the June 2022 rebalance capping for Chinese renminbi was at 3%, and was revised to 7% per the methodology changes [announced](#) in October 2021.

For the U.S. Dollar Index, the Euro and the Pound indices, the rebalanced target weights are applied after the close of the last trading day in June². Trade data and liquidity listed in the following table;

Index	Trade Data	Liquidity Data
U.S. Dollar	Federal Reserve	Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity
Euro	IMF	Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity
Pound	IMF	Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity

² Please note that the rebalance schedule for the U.S. Dollar Index was adjusted from December to June per the methodology changes [announced](#) in October 2021.

INDEX CALCULATIONS

If PR_t and TR_t are price return and total return of the index on any day t

$$PR_t = \sum W_{i,Y} * (1 - S_{i,t-1} / S_{i,t})$$

$$TR_t = PR_t + 2 / 360 * UD_{t-1} - \sum W_{i,Y} * D_{i,t-1} / A_i$$

Where

$S_{i,t}$ = Spot for currency i on day t , expressed in foreign currency per underlying currency

terms $D_{i,t}$ = Forward implied yield for currency i on day t

UD_t = Funds rate for underlying currency on day

t $W_{i,Y}$ = Weight of currency i in year Y

A_i = Annual day count convention for currency i

The price return index level (IndexPR) on any day t are calculated as

$$\text{IndexPR}_t = \text{IndexPR}_{t-1} * (1 + PR_t)$$

Similarly, the total return index level (IndexTR) on any day t is calculated as

$$\text{IndexTR}_t = \text{IndexTR}_{t-1} * (1 + TR_t)$$

The total return index has an inverse counterpart that seeks to track a position that is short the underlying currency, and its daily total return (ITR) and index level (IndexIR) on any day are calculated as follows:

$$\text{ITR}_t = (-1) * PR_t + \sum W_{i,Y} * D_{i,t-1} / A_i$$

$$\text{IndexIR}_t = \text{IndexIR}_{t-1} * (1 + \text{ITR}_t)$$

The base level for Bloomberg Currency Indices is set at 1000 on December 31, 2004.

DATA

The price return indices are generated in real-time, while the total & inverse indices are generated end-of-day.

Index	Bloomberg Index Ticker		
	Price Return	Total Return	Inverse Return
Bloomberg Dollar Spot Index	BBDXY	BBDXT	BBDXI
Bloomberg British Pound Index	POUND		
Bloomberg Euro Index	EURO		

Data Providers and Data Extrapolation

The Currency Indices are rules-based and its construction is designed to consistently produce Index Levels without the exercise of discretion. The Indices are produced without the interpolation or extrapolation of input data. As further discussed below, the Indices use defined data backups and/or level carry-forwards rather than interpolation or extrapolation, but the Administrator will update this Methodology and its internal procedures should either become necessary.

In addition, the Administrator seeks to avoid contributions of input data that may be subject to the discretion of the source of such data and instead seeks to use input data that is readily available and/or distributed for a number of non-index or benchmark creation purposes. Accordingly, the Indices require no 'contributors' to produce and no codes of conduct with any such sources are required.

End of Day Index Levels

End of Day index levels are derived using the New York 4:00 pm BFIX, other than for the Korean Won which uses the 4:00 pm CMFN.

"BFIX" refers to BISL's family of daily currency fixing rates generated throughout the trading day at fixed, half-hourly

intervals. The BFIX rates are created by taking a Time-Weighted Average Price (TWAP) of the geometric mid-rates of Bloomberg Generic (BGN) and or Bloomberg Generic Price Executable (BGNE) prices leading up to and following the fixing time. The BGN is a sophisticated pricing algorithm that produces accurate indications of bid and ask quotes that are derived from hundreds of quality sources, including indicative, executable and executed price quotes from money-centre and regional banks, broker-dealers, inter-dealer brokers, and trading platforms. The BGNE uses purely executable data from Bloomberg's FXGO platform delivering greater transparency into current market liquidity. They are received from a diverse universe of sources who provide them for the primary purpose of soliciting actual FX transactions from the market. For more information on BFIX and its methodology, see here: http://www.bloomberg.com/notices/content/uploads/sites/3/2016/04/bfix_methodology.pdf.

"CMFN" is the Bloomberg Composite Rate (CMP) determined at 4:00 pm New York time. The Bloomberg Composite Rate (CMP) is a calculation of the mid-price of the highest bid and lowest offer from underlying data providers. At any given point in time, the composite bid rate is equal to the highest bid rate of all of the currently active, provided bank indications. The composite ask rate is equal to the lowest ask rate offered by these same active, provided bank indications. For rates to be accepted into the composite, they must come from data providers who have been "privileged" to send data to the composite, and the pricing must be considered valid and current. For additional information on Bloomberg FX pricing, including CMFN, please refer to QFX <GO> on the Bloomberg Professional service.

One month forward implied yields are used for each currency to calculate the total return index. The "implied yield" is the predicted yield based on the premise that the yield curve on a particular day is a strong indication of the future state. Where unavailable for historical time periods, monthly local currency deposit rates were used.

Real-time Index Levels

The intraday price levels for the Bloomberg Currency Indices are calculated primarily by using the BGN, other than for the South Korean Won which uses CMFN. All real-time currency index levels are considered indicative. In the event a real-time index level cannot be published due to data inadequacy or other issues, the Administrator will not resort to alternative data sources, will leave the level blank or carry it forward, and will not restate or correct blank or carried-forward levels. More information regarding the BGN, including its inputs and algorithms, is available in the BFIX methodology document linked above.

Historic Index Levels

Effective as of the end of May 2013, for BBDXY, the currency for China was replaced from the domestic spot (CNY) to the offshore spot (CNH) in view of the increasing liquidity of the CNH market and its greater ease of access to foreign market participants. For the British Pound Index, the switch from CNY to CNH was effective as of the end of March 2014. All index level prior to the index launch are consider pro-forma.

For additional information on BISL FX pricing, please refer to QFX <GO> on the Bloomberg Terminal.

Currency	1 Month Implied Yield	1 Month Deposit Rate	Intraday Spot	Closing Spot	Day Count
AUD	AUDI1M	BBSW1M	AUD BGN	AUD F160	365
CAD	CADI1M	CDOR01	CAD BGN	CAD F160	365
CHF	CHFI1M	SF0001M	CHF BGN	CHF F160	360
CNH	CNHI1M		CNH BGN	CNH F160	365
EUR	EURI1M	EURO01M	EUR BGN	EUR F160	360
GBP	GBPI1M	BP0001M	GBP BGN	GBP F160	365
JPY	JPYI1M	JY0001M	JPY BGN	JPY F160	360
KRW	KRWI1M	KRBO1M	KRW CMFN	KRW CMFN	365
MXN	MXNI1M	MXIBTIE	MXN BGN	MXN F160	360
SGD	SGDI1M	SORF1M	SGD BGN	SGD F160	365
TWD	TWDI1M	TAIBOR1M	TWD BGN	TWD F160	365
BRL	BRLI1M		BRL BGN	BRL CMFN	360
SEK	SEKI1M		SEK BGN	SEK F160	360
NOK	NOKI1M		NOK BGN	NOK F160	360
USD	USDI1M		USD BGN	USD F160	360
TRY	TRYI1M		TRY BGN	TRY F160	360
RUB	RUBI1M		RUB BGN	RUB F160	360
INR	INRI1M		INR BGN	INR F160	360

Index	Fund Rate	Ticker
Bloomberg Dollar Total Return Index	Fed Funds Rate	FEDL01 Index

INDEX CALENDAR SCHEDULE

Effective January 3, 2017, Bloomberg Currency Indices follows a holiday schedule which excludes Christmas Day (and observed), New Year's Day (and observed), and Good Friday as business days.

DATA HIERARCHY AND DATA INPUT REVIEW

The indices strive to be reflective of the currency markets they are designed to measure. They therefore favor, consistent with market practice, the following hierarchy of input data:

(1) executed prices, (2) executable prices and (3) indicative prices.

BFIX, BGN, and CMFN are aligned with this hierarchy and only use such prices.

ACTIVE MARKETS

In selecting to measure against the top 20 currencies by measure of liquidity, the indices are focused on presenting only those most liquid and active currency markets. Also, BFIX and CMFN, as inputs to the indices, will only produce prices where an active market exists, defined as:

- (a) For BFIX where (i) BFIX has received from BGN at least one bid and ask price in the fixing window, and (ii) the bid and ask are within 30 seconds of each other. In no event will BFIX take a BGN price that is from a single source. If no qualified BGN price can be produced within a fixing window, the previous fix will be

carried forward.

- (b) For CMFN, where it receives at least one bid and ask, from which CMFN is able to produce a mid-price. Absent such an active market, CMFN will produce no price, and will not carry forward the previous price.

STRESS EVENTS

If a BFIX or CMFN rate is unavailable due to market holidays or unforeseen events, the end-of-day Bloomberg Currency Indices will be calculated using the previous day's New York 4:00 pm BFIX or CMFN rate. If a New York 4:00 pm BFIX or CMFN currency rates are unavailable for more than ten consecutive business days, escalation to the Benchmark Governance and Operations Committee ("BGO"), as further discussed below, will be made to determine whether to use an equivalent CMFN rate (in the case of a BFIX issue), or remove the currency from the index (in the case of a BFIX or CMFN issue). Any such removal will be subject to Benchmark Oversight Committee ("BOC") review, as well as the transition policies of the Administrator.

LIMITATIONS OF THE INDEX

Though the Indices are designed to be representative of the markets they measure or otherwise align with their stated objective, they may not be representative in every case or achieve their stated objective in all instances. They are designed and calculated strictly to follow the rules of this Methodology, and any Index Level or other output is limited in its usefulness to such design and calculation.

Markets can be volatile, including those market interests which the Indices intend to measure or upon which the Indices are dependent in order to achieve their stated objective. For example, illiquidity can have an impact on the quality or amount of data available to the Administrator for calculation and may cause the Indices to produce unpredictable or unanticipated results.

In addition, market trends and changes to market structure may render the objective of the Index unachievable or to become impractical to replicate by investors.

In particular, the Indices aims to track the performance of a basket of global currencies versus the underlying index (U.S. dollar, euro, and British pound). The Indices are therefore subject using the previous days BFIX rates for the individual constituent, if the current day's BFIX rate is unavailable for daily calculation.

BENCHMARK OVERSIGHT AND GOVERNANCE

Benchmark Governance, Audit and Review Structure

BISL uses two primary committees to provide overall governance and effective oversight of its benchmark administration activities:

- The Product, Risk & Operations Committee ("PROC") provides direct governance and is responsible for the first line of controls over the creation, design, production and dissemination of benchmark indices, strategy indices and fixings administered by BISL, including the Indices. The PROC is composed of Bloomberg personnel with significant experience or relevant expertise in relation to financial benchmarks. Meetings are attended by Bloomberg Legal & Compliance personnel. Nominations and removals are subject to review by the BOC, discussed below.
- The oversight function is provided by Bloomberg's Benchmark Oversight Committee ("BOC"). The BOC is independent of the PROC and is responsible for reviewing and challenging the activities carried out by the PROC. In carrying out its oversight duties, the BOC receives reports of management information both from the PROC as well as Bloomberg Legal & Compliance members engaged in second level controls.

On a quarterly basis, the PROC reports to the BOC on governance matters, including but not limited to client complaints, the launch of new benchmarks, operational incidents (including errors & restatements), major announcements and

material changes concerning the benchmarks, the results of any reviews of the benchmarks (internal or external) and material stakeholder engagements.

Internal and External Reviews

BISL's Index administration is also subject to Bloomberg's Compliance function which periodically reviews various aspects of its businesses in order to determine whether it is adhering to applicable policies and procedures, and assess whether applicable controls are functioning properly. In addition, Bloomberg may from time to time appoint an independent external auditor with appropriate experience and capability to review adherence to benchmark regulation. The frequency of such external reviews will depend on the size and complexity of the operations and the breadth and depth of the Index use by stakeholders.

Index and Data Reviews

The Administrator will review the Indices (both the rules of construction and data inputs) on a periodic basis, not less frequently than annually, to determine whether they continue to reasonably measure the intended underlying market interest, the economic reality or otherwise align with their stated objective. More frequent reviews may result from extreme market events and/or material changes to the applicable underlying market interests.

Criteria for data inputs include reliable delivery and active underlying markets. Whether an applicable market is active depends on whether there are sufficient numbers of transactions (or other indications of price, such as indicative quotes) in the applicable constituents (or similar underlying constituent elements) that a price (or other value, as applicable) may be supplied for such constituent(s). Where the constituents of the Indices are themselves other index levels or values, as in this Methodology, whether or not the underlying market is active is determined solely by reference to whether an official level or value is published in accordance with such underlying index's methodology.

There are no minimum liquidity requirements for Index constituents and/or minimum requirements or standards for the quantity or quality of the input data.

The review will be conducted by product managers of the Indices in connection with the periodic rebalancing of the Indices or as otherwise appropriate.

Any resulting change to the Methodology deemed to be material (discussed below) will be subject to the review of the PROC under the oversight of the BOC, each of which committees shall be provided all relevant information and materials it requests relating to the change. Details regarding the PROC and BOC are described above in Benchmark Governance, Audit and Review Structure.

Material changes will be reflected and tracked in updated versions of this Methodology.

BISL's Index administration is also subject to Bloomberg's Compliance function which periodically reviews various aspects of its businesses in order to determine whether it is adhering to applicable policies and procedures, and assess whether applicable controls are functioning properly.

Material changes related to the Indices will be made available in advance to affected stakeholders whose input will be solicited. The stakeholder engagement will set forth the rationale for any proposed changes as well as the timeframe and process for responses. The Administrator will endeavour to provide at least two weeks for review prior to any material change going into effect. In the event of exigent market circumstances, this period may be shorter. Subject to requests for confidentiality, stakeholder feedback and the Administrator's responses will be made accessible upon request.

In determining whether a change to an Index is material, the following factors shall be taken into account:

- The economic and financial impact of the change;
- Whether the change affects the original purpose of the Index; and/or

- Whether the change is consistent with the overall objective of the Index and the underlying market interest it seeks to measure

STAKEHOLDER ENGAGEMENT

BISL is in constant and ongoing engagement with its users through various channels, including via help desks, sales personnel and direct communication with product personnel. To help ensure the Index remains an accurate representation of the currency markets, it endeavors to meaningfully incorporate these engagements into improvements in processes and service.

EXPERT JUDGMENT

BISL may use expert judgment with regards to the following:

- Index restatements
- Extraordinary circumstances during a market emergency
- Data interruptions, issues, and closures

When expert judgment is required, BISL undertakes to be consistent in its application, with recourse to written procedures outlined in this Methodology and internal procedures manuals. In certain circumstances exercises of expert judgment are reviewed by senior members of BISL management and Bloomberg Compliance teams, and are reported to the PROC. BISL also maintains and enforces a code of ethics to prevent conflicts of interest from inappropriately influencing index construction, production, and distribution, including the use of expert judgment.

ERROR CORRECTIONS/RESTATEMENT POLICY

BISL strives to provide accurate calculation of its indices. However, to the extent a material error in index values is uncovered following publication and dissemination, a notification will be sent to index owners alerting them of such error and the expected date of a revised publication, if warranted.

BISL considers the following factors to determine whether to restate. Not all conditions need to be present to warrant a restatement, and certain factors may be more determinative than others depending on the circumstances of the given error.

- The relative importance of the data field impacted by the error;
- When the error occurred and when it was discovered;
- The number of indices and sub-indices affected;
- Whether the impacted indices are linked to tradable products;
- The magnitude of the error;
- The burden of restatement on client re-processing relative to the impact of the error;
- The impact of the restatement on analytical tools.

ADMINISTRATOR TRANSPARENCY

The Administrator does not use any third parties in:

- 1) data collection or analysis (other than market data vendors and/or others performing simple data aggregation or data delivery services);
- 2) computation or calculation of the official Index Levels; or
- 3) dissemination of the Index (other than any redistribution of official Index Levels).

In the event it does determine to use third parties in the performance of such roles, the Administrator will provide details of their function in this Methodology and establish appropriate controls in its internal procedures.

Dividends and coupon payments play no role in this Methodology, and are therefore not accounted for by the Index.

ENVIRONMENTAL, SOCIAL AND GOVERNANCE DISCLOSURE

EXPLANATION OF HOW ESG FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY	
1. Name of the benchmark administrator.	Bloomberg Index Services Limited ("BISL")
2. Type of benchmark	Other Benchmark
3. Name of the benchmark or family of benchmarks.	Bloomberg Currency Indices Family
4. Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>5. If the response to (4) is positive, please list below those ESG factors that are taken into account in the benchmark methodology.</p> <p>Please explain how those ESG factors are used for the selection, weighting or exclusion of underlying assets.</p>	
a) List of environmental factors considered:	Selection, weighting or exclusion:
N/A	N/A
b) List of social factors considered:	Selection, weighting or exclusion:
N/A	N/A
c) List of governance factors considered:	Selection, weighting or exclusion:
N/A	N/A
6. Data and standards used.	
a) Data input.	N/A
<p>(i) Describe whether the data are reported, modelled or, sourced internally or externally.</p> <p>(ii) Where the data are reported, modelled or sourced externally, please name the third party data provider.</p>	
b) Verification of data and guaranteeing the quality of those data.	N/A
Describe how data are verified and how the quality of those data is ensured.	
c) Reference standards	N/A
Describe the international standards used in the benchmark methodology.	
Information updated on:	21 April 2020

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